

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

Claims 20-23, 25-29, and 31-40 have been canceled in favor of new claims 41-61. Support for the subject matter of the new claims is provided in the original claims, Figs. 1-4, and paragraphs [0008], [0025], [0028], [0033], [0045]-[0047], [0049], [0051], and [0058] of the published specification. (It should be noted that references herein to the specification and drawings are for illustrative purposes only and are not intended to limit the scope of the invention to the referenced embodiments.)

Claims 20-31, 34, and 37-40 were rejected, under 35 USC §103(a), as being unpatentable over Kotzin et al. (US 6,173,005) in view of Ooba (US 6,717,929). Claims 35 and 36 were rejected, under 35 USC §103(a), as being unpatentable over Kotzin in view of Ooba and Kanemoto et al. (US 2002/0160721). Claims 32 and 33 were rejected, under 35 USC §103(a), as being unpatentable over Kotzin in view of Ooba and Onggosanusi et al. (US 2003/0016640). To the extent that these rejections may be deemed applicable to new claims 41-61, the Applicant respectfully traverses as follows.

Claim 41 recites features of canceled claim 20 and defines a transmitting apparatus having a spreading method setting section that sets a first parameter used for spreading first data and a second parameter used for spreading second data independently from each other, when: (i) the spread first signal, which is generated by performing spectrum spreading on the first data, is to be transmitted from a first antenna to a receiving apparatus, (ii) the spread second signal, which is generated by performing spectrum spreading on the second data, is to be transmitted

from a second antenna to the receiving apparatus, and (iii) the first antenna and the second antenna are different from each other. The first parameter is one of: (x) a spreading factor of the spectrum spreading, (y) how many signals are to be multiplexed to generate a first code multiplexed signal, and (z) how many spreading codes are to be assigned to the each of a plurality of receiving apparatuses. The second parameter is one of: (s) a spreading factor of the spectrum spreading, (t) how many signals are to be multiplexed to generate a second code multiplexed signal, and (u) how many spreading codes are to be assigned to each of the receiving apparatuses.

When a code-multiplexed signal, in which varying data is spectrum spread and multiplexed, is transmitted from a plurality of antennas, the above-noted features of the claimed invention support an advantage of setting parameters to use in spectrum spreading individually, per data of each antenna. Thus, the claimed subject matter supports spectrum spreading of data using different parameters depending on the condition of communication in each antenna, so as to improve the data error rate performance while maintaining frequency use efficiency (see specification page 3, lines 13-18, and page 4, line 8, through page 5, line 2).

The Office Action proposes that Ooba discloses spreading sections (see Office Action page 5, line 21, through page 6, line 3), Kotzin discloses a spreading method setting section (see page 6, lines 4-11), and Ooba discloses transmitting sections (see page 6, lines 12- 22). However, it is submitted that that new claim 41 is allowable over the individual or combined teachings of these references, given that claim 41 clarifies the above-noted features distinguishing the invention from the teachings of the applied references, as should be apparent from the following.

Claim 41 expressly recites that spreading sections spread each data according to parameters that are set in a spreading method setting section and that transmitting sections transmit signals, upon which data subjected to spreading in a spreading section is multiplexed, to a receiving apparatus, which is a different apparatus from the transmitting apparatus, via respective antennas. Thus, individual sections each carry out part of the process of generating a code-multiplexed signal to be transmitted to a receiving apparatus, which is a different apparatus from the transmitting apparatus, and the processes in the individuals sections are all inter-related.

By contrast to the Applicants' claimed subject matter, the Office Action cites components of Kotzin's system that are components of a transmitting apparatus and cites components of Ooba's system that are components of a receiving apparatus. Consequently, the Office Action proposes a combination of Kotzin's and Ooba's teachings having Kotzin's transmitting functions and Ooba's receiving functions.

Although the combination of Ooba and Kotzin might provide a configuration in which the components of Ooba's receiving apparatus and the components of Kotzin's transmitting apparatus operate separately, such a combination does not provide a configuration in which these components cooperate.

More specifically, Ooba discloses that signals received using a plurality of antennas are spread and combined (i.e., are multiplexed), subjected to a frequency-domain transform, and then subjected to despreading (see, Ooba abstract). That is to say, according to Ooba, what is subject to processing in each component is received signals (see Ooba col. 4, lines 55-65). The components of Ooba's disclosure cited in the Office Action are used only to convert received signals for simplifying a frequency domain transform. Although, by this conversion, a code

multiplexed signal is generated on a temporary basis, this multiplexed signal is demultiplexed when the frequency domain transform is performed and, therefore, is not transmitted to an external apparatus in the form of a multiplexed signal.

Consequently, Ooba's components are not used to generate a code multiplexed signal that is transmitted to a different apparatus (receiving apparatus) and cannot operate in the same way as the components recited in claim 41, which are used to generate a signal that is transmitted to a different apparatus. As a result, the subject matter defined by claim 41 cannot be achieved by combining the teachings of Kotzin and Ooba.

Moreover, the Office Action proposes that Kotzin discloses individually setting spreading factors, as recited previously in claim 20 and now recited in claim 41, through the disclosure of setting amplitudes and phases of a Walsh code (see Kotzin, col. 10, lines 49-67). However, one of ordinary skill in the art would not interpret Kotzin's disclosure of Walsh code amplitudes and phases to be the same as or relevant to the Applicants' claimed subject matter of a spreading factor of spectrum spreading.

In accordance with the above discussion, the Applicant submits that Kotzin and Ooba, considered individually or in combination, do not suggest the combination of features recited in claim 41 and, thus, do not render obvious the subject matter defined by claim 41. Independent claims 60 and 61 similarly recite the above-mentioned subject matter distinguishing apparatus claim 41 from the applied references, although claim 60 does so with respect to a method. Therefore, allowance of claims 41, 60, and 61 and all claims dependent therefrom is considered to be warranted.

Independent claim 54 recites features of canceled claim 35 and defines a receiving apparatus having a separating section that generates a first code multiplexed signal and a second code multiplexed signal by separating spacially multiplexed signals using a channel estimation matrix. The channel estimation matrix includes characteristics of each of a plurality of transmission channels through which the multiplexed signals pass. A first despreading section despreads one of the spread signals in the first code multiplexed signal using a first parameter, and a second despreading section despreads one of the spread signals in the second code multiplexed signal using a second parameter. The first and second parameters are set independently from each other. The first parameter is one of: (x) a spreading factor of the spectrum spreading, (y) how many signals are to be multiplexed to generate the first code multiplexed signal, and (z) how many spreading codes are to be assigned to each receiving apparatus. The second parameter is one of: (s) a spreading factor of the spectrum spreading, (t) how many signals are to be multiplexed to generate the second code multiplexed signal, and (u) how many spreading codes are to be assigned to each receiving apparatus.

The Office Action proposes that Kanemoto discloses the despreading sections previously recited in claim 35 and now similarly recited in claim 54, because Kanemoto discloses using communication quality, represented by parameters such as FER and others, as a reference for selecting spreading codes and using the selected spreading codes for despreading processing of received signals (see Office Action page 3, first paragraph). The Office Action further proposes that Ooba also discloses Applicant's claimed despreading sections (see page 13, last four lines).

Claim 54 clarifies that the claimed despreading sections despread a plurality of code multiplexed signals that are spacially multiplexed using a channel estimation matrix. One of

ordinary skill in the art recognizes that despreading code multiplexed signals that are spacially multiplexed using a channel estimation matrix differs from despreading signals using spreading codes, as disclosed by Kanemoto and Ooba.

Furthermore, Applicant's receiving apparatus defined by claim 54 has features matching and supporting the features of the transmitting apparatus of claim 41.

Accordingly, the Applicant submits that even if Kotzin, Ooba and Kanemoto were combined as proposed in the Office Action, the result still would lack the above-noted features of claim 54, and thus, these references, considered individually or in combination, do not render obvious the subject matter defined by claim 54. Therefore, allowance of claim 54 and all claims dependent therefrom is deemed to be warranted.

In view of the above, it is submitted that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

/James Edward Ledbetter/

Date: September 24, 2009
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